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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,454	01/27/2004	Luca Difalco	02-CT-495/DP	8595

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EXAMINER

SANDVIK, BENJAMIN P

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/765,454

Applicant(s)

DIFALCO ET AL.

Examiner

Ben P. Sandvik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, 9, 16, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Broich et al (U.S. Patent #4768075), hereafter known as Broich.

With respect to **claims 1, 9, and 16**, Broich teaches a first die including a first semiconductor device (Fig. 6, 1), a second die including a second semiconductor device (Fig. 6, 2'), a DBC layer that includes a first metal layer (Fig. 6, 14), a second metal layer (Fig. 6, 15), a ceramic material layer interposed between the first and second metal layers (Fig. 6, 16), a third metal layer to which the first metal layer of the DBC layer and the first die are attached (Fig. 6, 20), wherein the second die is attached to the second metal layer of the DBC layer.

With respect to **claims 8 and 21**, Broich teaches a first semiconductor device that is electrically coupled to the second semiconductor device (Fig. 6, 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 10, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broich, in view of Shimizu et al (U.S. Patent #6201696).

With respect to **claim 2, 10, and 17**, Broich teaches all of the limitations of claim 1, 9, and 16 respectively, but does not teach that the first semiconductor device is a bipolar device and the second semiconductor device is a MOS device. Shimizu teaches that a direct copper bond can be used for either a bipolar device or MOS device (Col 9 Ln 50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the device of Broich so that the MOS device is attached to the second metal layer of the DBC layer, and the bipolar device is attached to the third metal layer in order to provide the MOS with more effective heat transfer capability without affecting the function of the package.

Claims 3, 4, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broich and Shimizu, in view of Young et al (U.S. PG Pub #20020036355).

With respect to claims **3, 4, 11, and 18**, Broich and Shimizu teach all of the limitations of claims 2, 10, and 17 respectively, and furthermore Broich teaches a bipolar power transistor (Col 2 Ln 20), a MOS power transistor (Col 2

Ln 29), and a cascode circuit (Col 2 Ln 43), but neither Broich nor Shimizu teach a collector terminal directly electrically connected to the third metal layer. Young teaches a collector terminal directly electrically connected to a lead frame (Paragraph 33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the package of Broich with the collector terminal directly electrically connected to a lead frame as taught by Young in order to maintain a slim profile for the package.

Claims 5, 6, 12, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broich, Shimizu, and Young, further in view of Dekker et al (U.S. PG Pub 20010045619).

With respect to **claims 5, 12, and 19**, Broich, Shimizu, and Young teach all of the limitations of claims 4, 11, and 18 respectively, but do not teach a cascode circuit wherein the emitter terminal is electrically connected to a drain terminal. Dekker teaches a cascode circuit wherein the bipolar transistor has an emitter terminal electrically connected to a drain terminal of the MOS transistor (Paragraph 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the cascode circuit of Broich with the emitter terminal electrically connected to a drain terminal as taught by Dekker in order to meet the desired functionality of the circuit.

With respect to **claim 6, 13, and 20**, Broich, Shimizu, Young, and Dekker teach all of the limitations of claims 5, 12, and 19 respectively, and furthermore

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Broich teaches a first pin being electrically connected to a base terminal (Fig. 6, 28), a second pin being electrically connected to a collector terminal (Fig. 6, 10), and a third pin being electrically connected to a gate terminal (Fig. 6, 13), but does not teach a pin being electrically connected to a source terminal. Young teaches a pin being electrically connected to a source terminal (Fig. 1, 111 and Paragraph 34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the source terminal to a pin in order to make the source available for outside connections.

Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broich, Shimizu, Young, and Dekker, further in view of Nakajima et al (U.S. PG Pub #200200190374).

With respect to **claims 7 and 14**, Broich, Shimizu, Young, and Dekker teach all of the limitations of claims 6 and 13 respectively, but do not teach a pin for controlling a signal at the emitter terminal of the bipolar transistor. Nakajima teaches a pin that is connected to an emitter terminal is used to control a signal (Fig. 1, 14 and Paragraph 106). It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect a pin to the emitter for controlling a signal in order to enhance the functional capabilities of the package.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben P. Sandvik whose telephone number is (571) 272-8446. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bps


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